Salton Sea and San Joaquin Valley Drainage Similarities

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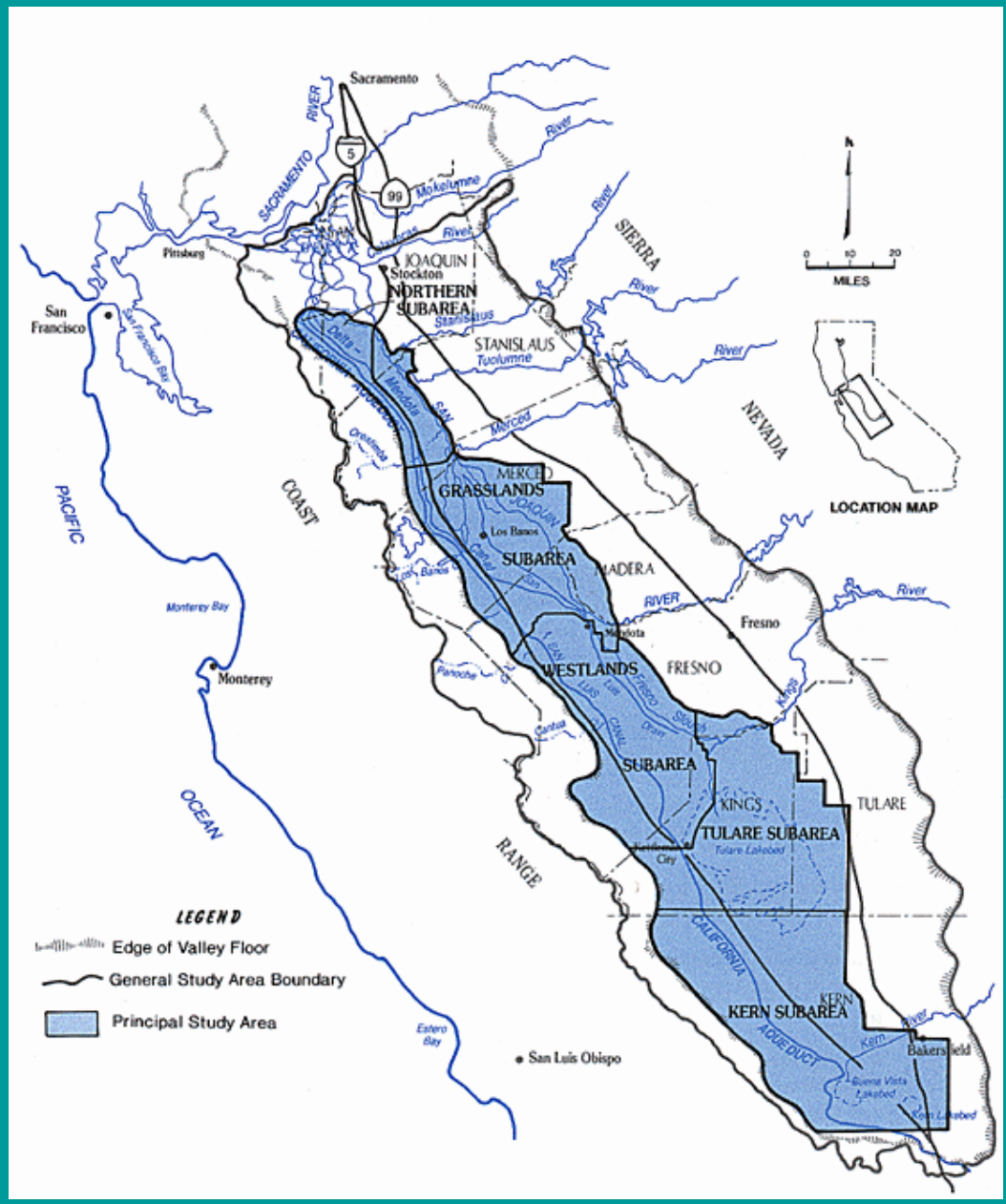
Salton Sea Advisory Committee

San Joaquin Valley Drainage Program Study Area



History of the Study Area

- Some lands irrigated with deep well pumps beginning in the 1930s
- Federal CVP and SWP water delivered in 1968 with drainage promised
- State-Federal study in 1979 recommended master drain for State and Federal service areas
- Partial Federal drain constructed in late 1970s—Ended at Kesterson Reservoir
- Bird problems discovered in 1983. Kesterson closed in 1985 and drains plugged thereafter

The San Joaquin Valley Drainage Program

- An Interagency Federal/State study effort – Costly
- A problem to define the problem
- Small effort to look for ocean or bay/delta disposal sites resulted in political decision to limit study to in-valley solutions

Historic Problem

- High water table
- Salinity

Surface Water Salt Inflow/Outflow
(railroad cars per day)

Current Problem

- High water table
- Salinity
- Selenium and other trace elements

The Search for Solutions

- Study focused on solving immediate problems and management of drainage problem in-valley, while recognizing the long-term problem with salt build-up
- Literature search initiated
- Massive research effort launched with a call to researchers
- On-the-ground research and development
  - Reducing or controlling the source of drainage water
  - Evaporation pond safety
  - Treatment of drainage water centered on Selenium removal; e.g.- Physical (especially reverse osmosis), Biological, and Chemical
  - Disposal of residual salts; e.g.- deep well injection, toxic waste sites
- Planning involved combinations of all of the above and more

Selenium in groundwater

Selenium Concentrations in Shallow Ground Water
Sampled between 1984 and 1989

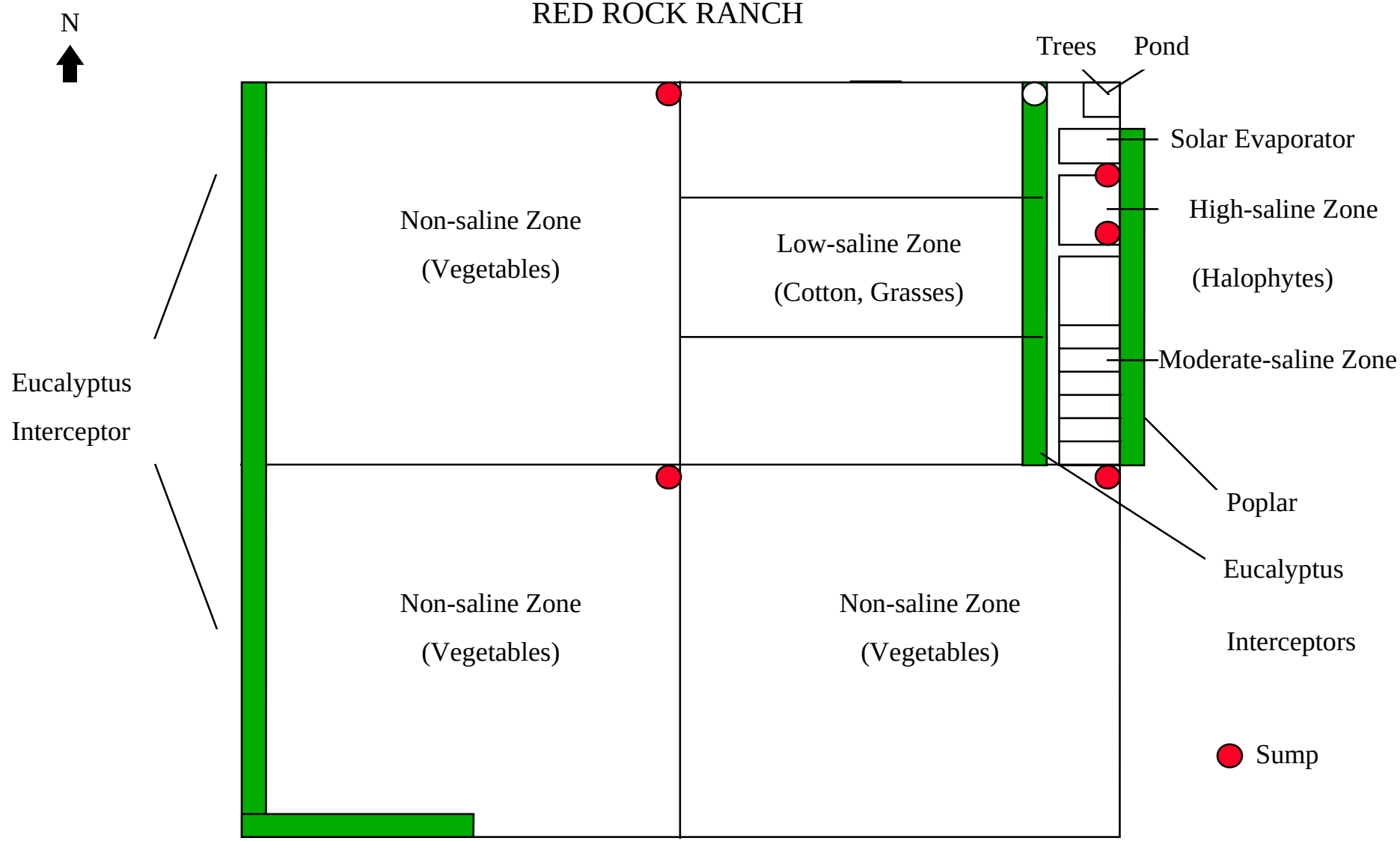
STUDY RECOMMENDATIONS AND IMPLEMENTATION

A plan involving the following was published in October 1990:

- Source control
- Drainage water reuse
- Improved evaporation ponds
- Land retirement
- Ground water management
- Discharge to the San Joaquin River
- Protection, restoration, and provision of substitute water supplies for fish and wildlife habitat
- Institutional change

INTEGRATED on FARM DRAINAGE MANAGEMENT

RED ROCK RANCH



American avocet & black necked stilt

Pond Modifications/Management

- Increase interior levee slopes
- Remove windbreak islands and other shallow-water areas
- Increase water depths
- Remove levee stabilization tires
- Levee vegetation control and
- Increase hazing activity

Hazing the birds

SIMILARITIES OF SALTON SEA AND SJV DRAINAGE PROBLEMS

- Large amounts of water
- High salt concentrations
- Potential toxic elements in water and sediments
- No solution readily available
- Simple solutions probably won’t work
- Some solutions may create severe environmental problems; e.g. bird and other wildlife
- Complicated technical solutions generally unproven and/or costly
- Planning, research and development take time and dollars

Federal and State Costs

- State—Over $50 million(1952-2000), $2.7 annually
- Federal--Over $100 million-includes pre-1985 costs, over $50 million in federal SJVDP(1984-1990), $30 million for Kesterson. FY 2004 about $4.5 million.
- Funding for research and demonstration projects--biological, chemical, and physical treatment
- After many years of R&D projects, a full-scale drainage treatment system for selenium removal has not been constructed and put in operation.

LESSONS LEARNED

- It is generally not fruitful to spend time looking for a quick fix or a silver bullet
- Beware of peddlers selling snake oil
- There are probably no simple solutions
- It is generally advisable to focus on smaller, environmental acceptable solutions that can be expanded incrementally when proven effective and safe
- Expect large costs for research, planning and implementation
- Expect surprises, trust to luck, and find a deep funding pocket!